

**ABSTRACT**

[37] An active voltage limiting and failure detection system for an energy storage cell of a multiple energy storage cell pack includes a first electrical circuit and a second electrical circuit connected to the energy storage cell. The first electrical circuit is powered by the energy storage cell and includes means for drawing a significant amount of power from the energy storage cell when a cell voltage  $V_{cell}$  reaches a maximum voltage  $V_{max}$  to reduce the cell voltage  $V_{cell}$ , means for stopping the drawing of the significant amount of power to reduce the cell voltage  $V_{cell}$  when the cell voltage  $V_{cell}$  reaches a minimum voltage  $V_{min}$ , and means for drawing no power when the cell voltage  $V_{cell}$  reaches a shutdown voltage  $V_{shutdown}$ . The second electrical circuit includes means for indicating a cell active condition when the cell voltage  $V_{cell}$  is above a threshold active voltage  $V_{active}$ , and means for indicating a cell inactive condition when the cell voltage  $V_{cell}$  drops below the threshold active voltage  $V_{active}$ .